

# SOLENOZETES GALLONAE SP. NOV., FIRST RECORD OF THE PLASMOBATIDAE IN AUSTRALIA (ACARI: ORIBATIDA)

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Hunt, G.S. 1994 06 01: *Solenozetes gallonae* sp. nov., first record of the family Plasmobatidae in Australia (Acari: Oribatida). *Memoirs of the Queensland Museum* 35(1): 129-134, Brisbane. ISSN 0079-8835.

*Solenozetes gallonae* sp. nov. is described from rainforest in Queensland, Australia, and a rediagnosis given for *Solenozetes* Grandjean, 1932 (Plasmobatidae). The status and distribution of other species in the genus are summarised and generic level characters analysed.

□ Acari, Oribatida, Plasmobatidae, *Solenozetes*, Australia, rainforest.

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The Plasmobatidae Grandjean, 1961 is a small group of oribatid mites with a mostly tropical-subtropical distribution extending from the Oriental Region and western Pacific to the eastern Palaeartic and Neotropical Regions. They inhabit litter, moss and epiphytes on tree trunks.

Together with the Hermanniellidae, they constitute the superfamily Hermannielloidea, a taxon characterised by distinctive lateral tubes which bear the pore of the lateral opisthosomal glands (gla in Fig. 1D). Adult Plasmobatidae carry the exuviae ("scalps") of the larva and of three nymphal instars (Fig. 1A,B) which obscure the inconspicuous notogastral setae. They are readily distinguished from the Hermanniellidae which carry a tightly appressed and inconspicuous tritonymphal scalp which bears conspicuous setae. The gnathosoma of the Plasmobatidae is characterised by an elongate subcapitulum above which lie the elongate chelicerae. Definitions of both families are given by Grandjean (1962).

The Plasmobatidae comprises three genera, *Plasmobates* Grandjean, 1929, *Solenozetes* Grandjean, 1932 and *Orbiculobates* Grandjean, 1961, which may be distinguished by the key in Balogh & Balogh (1988, 1992). Generic level characters are analysed below with insights provided by *Solenozetes gallonae* sp. nov. The occurrence of this species in Australia is an important addition to the known distribution of the family.

## MATERIALS AND METHODS

In general, terminology follows Balogh & Balogh (1992), and Grandjean (1961) and Norton (1977) for leg chaetotaxy. The shapes of setae and surface ornamentation follow Mahunka & Zomperi (1985). Measurements are in micrometres,

those for body length were made ventrally from the tip of the rostrum to the rear of the scaps. A Cambridge Stereoscan 120 was used for SEM. Repositories for type material are AM, Australian Museum, Sydney; ANIC, Australian National Insect Collection, Canberra; QM, Queensland Museum, South Brisbane.

## CHARACTER ANALYSIS AT GENERIC LEVEL

*Scalps.* Grandjean (1932) erected *Solenozetes* as he considered the type species, *Plasmobates cribratus* Grandjean, 1929 from Venezuela, possessed only a tritonymphal scalp. In his 1961 paper, however, he regarded this as an error (scalps can fall off) and questioned the separate status of *Solenozetes*. He nevertheless retained the genus, without giving a clear rediagnosis. Apart from an anterior indentation which characterises the *Orbiculobates* tritonymphal scalp (Grandjean, 1961), scalp morphology appears to be useful only at the species level.

*Shape of lateral tubes.* Balogh (1972) used this as a key character to distinguish *Plasmobates* from *Solenozetes* and was followed, rather tentatively, by Mahunka (1983) when describing *S. flagellifer* from Mexico. This key character was abandoned by Balogh & Balogh (1988; 1992) and appears to be of value only at the species level.

*Number of genital setae and presence/absence of aggenital setae.* Balogh & Balogh (1988) transferred *P. carinatus* Hammer, 1961 from Peru and *P. flagellatus* Balogh & Mahunka, 1969 from Amazonia to *Solenozetes* on the basis that they had 6 pairs of genital setae and no aggenital setae (*Plasmobates* has 7 pairs and 1 pair respectively).

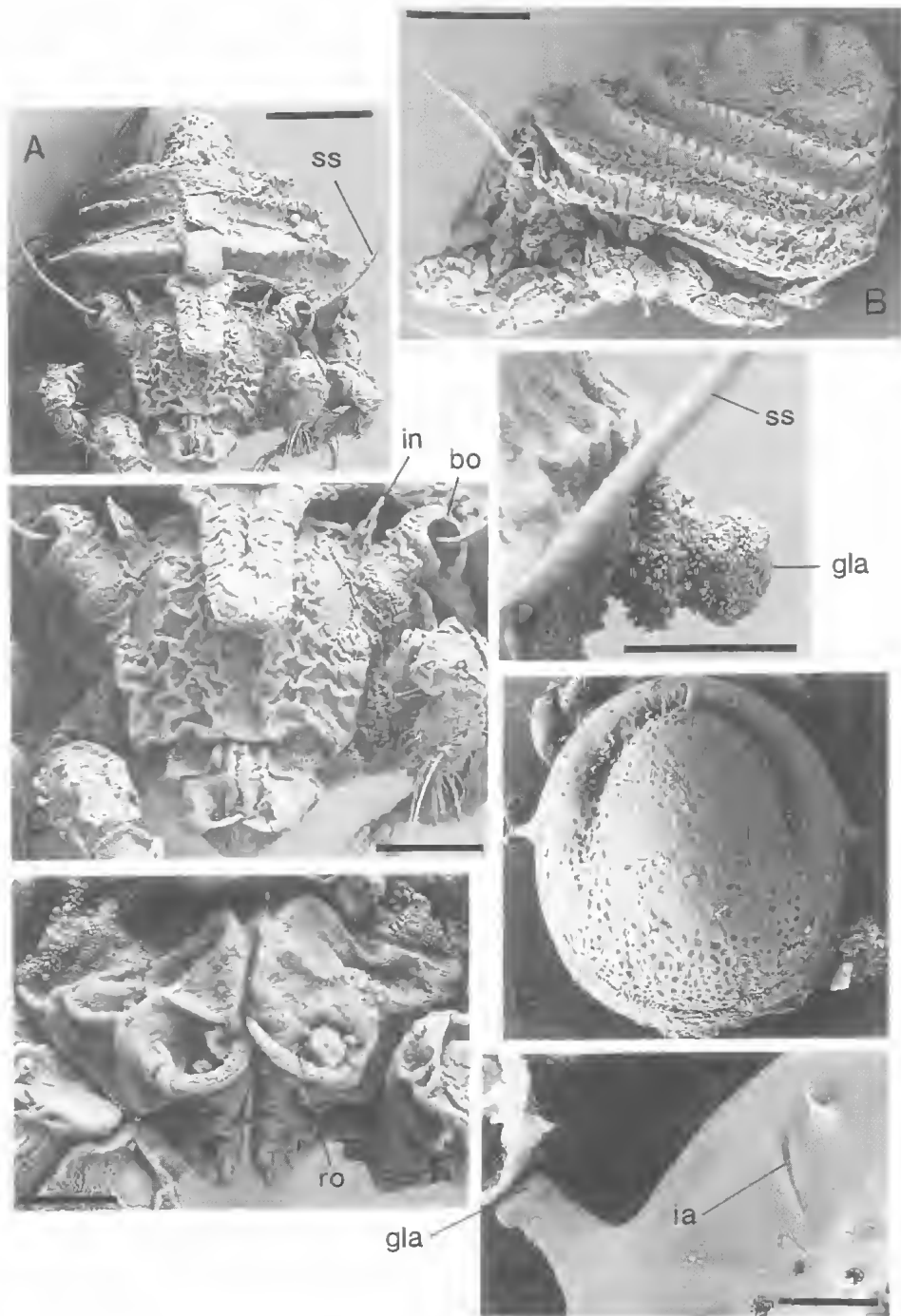


FIG. 1. *Solenozetes gallonae* sp. nov. A,C,D,F, frontal. A, whole body; C, prodorsum; D, lateral tube with cerotegument; F, rostral area. B, whole body, lateral; E, notogaster without scalps, dorsal; G, detail lateral tube area without cerotegument and scalps (bo, bothridium; gla, lateral tube of notogastral gland; ia, fissura ia; in, interlamellar seta; ro, rostral seta; ss, sensillus). Scale bars: A,B,E, 100 $\mu$ m; C, 50 $\mu$ m; D,F,G, 20 $\mu$ m.

*P. hyalinus* Hammer, 1971 from Fiji, *P. acutirostrum* Hammer, 1973 from Western Samoa and *P. asiaticus* Aoki, 1973 from Japan have 6 pairs of genital and no aggenital setae. Hammer (1979) describes *P. javensis* from Java as having 7 pairs of long genital setae but no aggenital setae. I have examined the type and it appears to have 6 genital setae on the right side and a doubtful alveolus of a seventh on the left. However, formal placement of some or all of these species in *Solenozetes* should await a thorough revision of the family including reappraisal of characters and a re-examination of the type of *S. cribratus*.

*P. schubarti* Perez-Inigo & Baggio, 1988 from Brazil has 7 pairs of genital setae and 1 pair of aggenital setae and would presumably remain in *Plasmobates* together with the type species, *P. pagoda* Grandjean, 1929 from Martinique.

*Shape of bothridium.* Except perhaps for *O. transvectus* (Grandjean, 1929), descriptions of species with 6 pairs of genital setae (and *P. javensis*), seem to indicate that the bothridial wall forms a partial hood over the bothridial cavity but is deeply invaginate anterolaterally (Fig. 1C). In *P. pagoda* and *P. asiaticus* (7 pairs), the bothridium is not hooded and has a much more open structure. It is invaginate in the mesad as well as the laterad wall. A "hooded" bothridium may be a shared derived character for *Solenozetes* and *Orbiculobates*, as suggested by its absence in Hermaniellidae and Liodidae, outgroups which have a low, open bothridium. The more open bothridium seems to be correlated with a shorter sensillus.

*Notogastral sculpturing.* Most *Plasmobates* and *Solenozetes* have a pitted (alveolate) notogaster. The two *Orbiculobates* species, *O. orbiculus* (Grandjean, 1929) and *O. transvectus*, both from Martinique, have a smooth notogaster with scalp retention assisted by an anterior tuft of filaments. *Orbiculobates australis* Balogh & Csiszar, 1963 from Argentina, however, has a smooth notogaster without filaments. It has subsequently been placed in *Solenozetes* by Balogh & Balogh (1988).

*Accessory tooth on movable finger of chelicera* (as in Fig. 2C). Grandjean (1929: pl.3F; 1961) does not record it but R.A. Norton (pers. comm.) reports it in a new species of *Orbiculobates* and several probably undescribed *Solenozetes* spp. and *Plasmobates* spp. It is present in *S. gallonae* and on the types of *S. carinatus* and *P. javensis*. The structure appears to be a shared

derived character at the family level. Its function is unknown but it may assist in breaking food.

## SYSTEMATICS

### *Solenozetes* Grandjean, 1932

*Solenozetes* Grandjean, 1932: 653; 1961: 127; Balogh, 1972: 57; Balogh & Balogh, 1988: 87; 1992: 42.

#### TYPE SPECIES

*Plasmobates cribratus* Grandjean, 1929; by monotypy.

#### DIAGNOSIS

Plasmobatidae with 6 pairs of genital setae but no aggenital setae. Anterior margin of notogaster without mesial tuft of filaments and correlated invagination of tritonymphal scalp. Notogaster usually alveolate or foveolate; lateral tubes of variable shape. Sensillus very long, filiform or sometimes flagellate; posterior wall of bothridium forms partial hood over bothridial cavity, anteriolateral wall deeply excavate allowing sensillus greater movement in laterad direction. Chelicera of at least some species with strong accessory tooth on movable finger.

### *Solenozetes gallonae* sp. nov.

(Figs 1-3)

#### ETYMOLOGY

For Ms Julie Gallon who collected the material.

#### TYPE MATERIAL

HOLOTYPE: adult, QM, Queensland, foot of Blackbutt Range, 5km. E. of Benarkin, rainforest, leaf litter, QM berlesate 522, J. Gallon, 30 Mar 1983.

PARATYPES: QM, same data, 2 adults; AM, same data, 1 adult; ANIC, same data, 1 adult.

#### OTHER MATERIAL

QMS20116 (SEM Stub No. 142), foot of Blackbutt Range, 5km. E. of Benarkin, rainforest, leaf litter, QM berlesate 522, J. Gallon, 30 Mar 1983, 2 adults; QMS20117 (SEM Stub No. 100), same data, 5 adults; QM (SEM Stub No. 129), same data, adult notogaster without scalps.

#### DIAGNOSIS

Sensillus much longer than distance between interlamellar setae, filiform, not flagellate, and not expanding subdistally; lateral tubes directed only slightly forward and distally expanded into

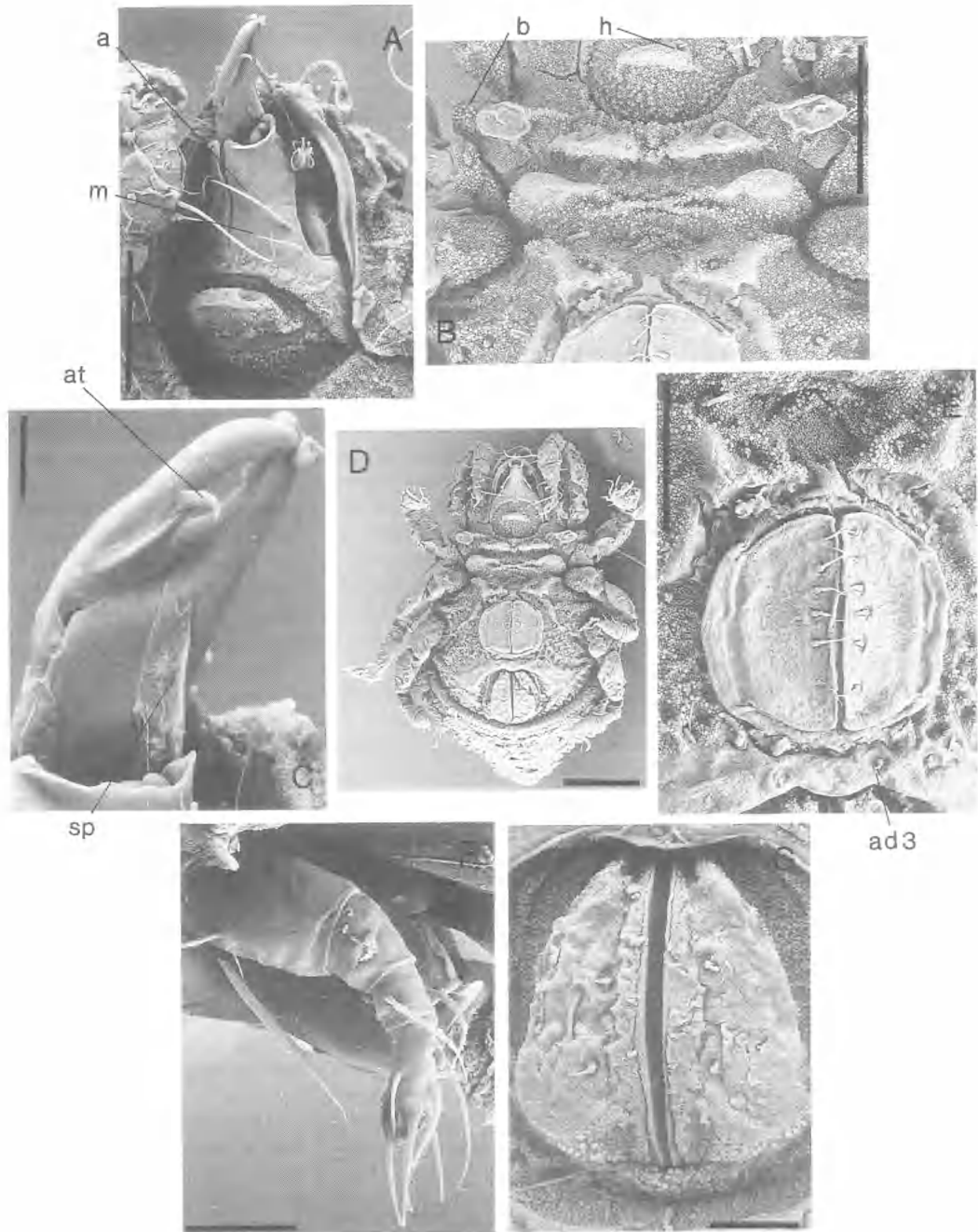


FIG. 2. *Solenozetes gallonae* sp. nov. A-G, ventral aspect. A, gnathosoma; B, epimeral region; C, right chelicera; D, whole animal; E, genital plates; F, pedipalp; G, anal plates. a,m,h, gnathosomal setae; ad3, adanal seta; at, accessory tooth; b, lateral boss between legs I and II; sp, sword-like process. Scale bars: A,B,E, 50 $\mu$ m; D, 100 $\mu$ m; C, 10 $\mu$ m; F,G, 20 $\mu$ m.

|| knob-like structure; rostral setae robust, short and curved strongly inwards.

#### DESCRIPTION

*Adults.* Grey; body small, 7 specimens 355, 376, 402, 406, 420, 422, 423µm long.

*Prodorsum.* Rostrum separated from remainder of prodorsum by depressed area and distinct break in cerotegument pattern (Fig. 1C) but not by deep narrow groove. Rostral tecta converging to V-shaped point, separated by mesal split; rostral setae robust, short, arising from apophysis and curved strongly inwards (Fig. 1F). Lamellar setae on margin of prodorsum, extremely minute. Posterior to rostrum cerotegument strongly folded into irregular reticulate pattern. Bothridium long; posterior wall forming partial hood over cavity (Fig. 1C), anterolateral wall deeply excavate; sensillus long (Fig. 1A,B), about 40% longer than interbothridial distance, filiform but not flagellate, more or less even in diameter, tapering only at end and curving mesad distally, covered with widely spaced granules (Fig. 1D) but not ciliate. Interlamellar seta baculiform, unevenly bifid, mostly covered with cerotegument, reaching to about level of bothridial rim when viewed anteriorly, arising from strong tubercle slightly less than seta in height; seta separated by about width of its tubercle from bothridium (Fig. 1C).

*Notogaster.* Scalps with raised, crenellate margins (Fig. 1B), and mesal tongue-shaped anterior extensions (Fig. 1A), that of tritonymph considerably overhanging prodorsum (Fig. 1C). Notogaster with scalps removed almost circular (Fig. 1E), length (n=1) 290, width (excluding lateral tubes) 250; convex except for intramarginal horseshoe-shaped depression anterior to lateral tubes; alveolate with some pores more marginally (Fig. 1G), alveoli less pronounced in centre; lateral tubes directed only slightly forward, narrowest subdistally and distally expanded into knob-like structure (Fig. 1E), covered with granular cerotegument (Fig. 1D); only 5 pairs of notogastral setae seen, arising from short tubercles, 4 on posterior margin (Fig. 3A), 1 just anterior to fissura *ia* (Fig. 1G).

*Ventral morphology.* Gnathosoma (Fig. 2A). Seta a long and strong, seta m much less so; seta h short. Chelicera elongate ("pelopsiform"); movable finger with long recurved accessory tooth (at in Fig. 2C); fixed finger with flat sword-like terminally bifid process, probably Tragardh organ, lying in dorsal half of paraxial surface (sp in Fig. 2C). Pedipalp appears similar to *P. pagoda*

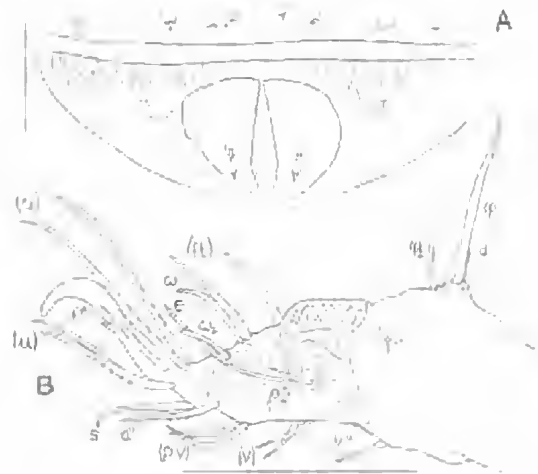


FIG. 3. *Solenozetes gallonae* sp. nov. A, setae at posterior of body (from SEM), B, leg I, terminal part, using Grandjean's notation. Scale bars: 50µm.

(Fig. 2F). Rutella forming a tube around chelicerae. Mentum subanteriorly with a strong transverse carina (Fig. 2A,D). Epimeres I-III with strong elevated carinae interrupted mesially (Fig. 2B); epimere I with a more mesial carina separated from more lateral carina; epimere IV with carinae weakly developed; epimeral chaetotaxy 3-?0-3-2. Sharp pedotectal tooth not present but a strong boss ("une forte saille ronde" of Grandjean, 1961: 102) present anterior to leg II. Genitoanal region alveolate adjacent to posterior area of genital plates (Fig. 2D,E); genital vestibule subcircular (Fig. 2E); genitoanal chaetotaxy 6-0-2-3, ad3 preanal (Fig. 2E); anal plates gradually broadening posteriad (Fig. 2G).

*Leg I.* Femur with strong crests of cerotegument (Fig. 1C). Solenidium sigma of genu globose terminally but shorter and stouter than in *P. pagoda*; seta d short and expanded subterminally. Seta d on tibia vestigial, lying against and sharing alveolus with piliform solenidium phi 1; phi 2 baculiform. Tarsus with strong proximodorsal crest of cerotegument; solenidium omega 1 ceratiform, omega 2 baculiform; setae tc, u, and a barbed; tc longer than claw. Claw with ventral accessory tooth.

#### COMMENTS

Setae labelled (Fig. 3B) by positional correspondence to setae in *P. pagoda* (Grandjean, 1961: fig. 3B); solenidia were confirmed optical-

ly, but eupathidic nature of setae p and s not resolved. Ontogeny of setae not studied. Size order of subcapitular setae seems to reflect anteriad hypertrophy of the subcapitulum.

#### ACKNOWLEDGEMENTS

This research is supported by an Australian Biological Resources Survey grant. I thank Dan Bickel, Australian Museum, Bruce Halliday, C.S.I.R.O. and Roy Norton, State University of New York, for commenting on the manuscript, and Henrik Enghoff of the University Zoological Museum, Copenhagen for the loan of Hammer's *Plasmobates* types. Suzanne Lindsay took the SEMs, Ross Pogson assisted with polarising microscopy and Roger Springthorpe did the camera ready layouts.

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